Drawings

Replacement drawings were mailed in response to Office Action dated September 22, 2006. Please find attached an Acknowledgement Receipt Postcard stamped Oct 10, 2006.

Applicant submits one (1) sheet of replacement drawings, consisting of FIG. 4, FIG. 5, and FIG. 6.

FIG. 4 was modified to make the for loop iteration condition consistent with the specification.

for all links b $\rightarrow$ j in **E**

Specifically **E** is an edge indicator or an adjacency matrix for graph W. Patent application specification P 3, lines 27-30. Also the body of the loop was modified to read:

$p = p + BCP (j, (1 - \boldsymbol{\alpha}) \bullet w /deg(b), \alpha)$

The letter s was replaced with $\boldsymbol{\alpha}$. Please find support for the modification in the original drawings filed with the application.

FIG. 5 was modified to make the for loop iteration condition consistent with the specification.

for all links i$\rightarrow$j in **E**

The same rational was followed as FIG. 4.

FIG. 6 was modified to make the for loop iteration condition consistent with the specification

for all links b $\rightarrow$ j in E.

The same rational was followed as FIG. 4.

REMARKS/ARGUMENTS

The Examiner is thanked for the performance of a thorough search.

By this amendment, Claim 1 has been amended. No claims have been added, cancelled, or amended. Hence, Claims 7-20 are pending in the application.

SUMMARY OF THE REJECTIONS/OBJECTIONS

Claims 7 was rejected under 35 U.S.C. § 112 first paragraph as failing to comply with the written description requirement.

Claims 7-14 were rejected under 35 U.S.C. § 112 second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards at the invention.

Claim 7 is objected to because line 8 contained the word "no" which should read as "not".

Claims 7-9 and 12-14 are rejected under U.S.C. § 102(b) as being anticipated by U.S. Patent No.6,285,999 to Page.

Claim 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,285,999 to Page ("*Page*") in view of internet citation "Topic Sensitive PageRank" Haveliwala et al. 7 May 2002, pages 1-17.

The title of the invention was objected to as being non-descriptive.

DRAWINGS

Replacement drawings were received by the USPTO Oct 10, 2006. A copy of the Acknowledgement Receipt is attached.

OBJECTIONS TO SPECIFICATION

The title of the invention was objected to as being non-descriptive. The applicants request the title of the application is changed to: "Computation of Page Authority Weights Using Personalized Bookmarks" Reconsideration is respectfully requested.

OBJECTIONS TO CLAIMS

Claim 7 was objected to because line 8 contained the word "no" which should read as "not". Amended Claim 7 addresses the objection. Reconsideration is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 112 FIRST PARAGRAPH

Claims 7 was rejected under 35 U.S.C. § 112 first paragraph as failing to comply with the written description requirement. The Office Action alleges that subject matter "at least some pages, within the collection, that do not belong to the set of one or more pages", "current page", "next page", "outgoing link from the current page to a next page that belongs to the collection", "establishing the next page as the current page", and "on the authority weights associated with the pages that match the search query" was not described in the specification. The applicants respectfully disagree.

The bookmark coloring process takes as an input a graph representing a collection of hyperlinked pages. "Where a collection of items can be represented by a graph, as a collection of hyperlinked pages can, an authority vector might represent the set of authority values for a vertex of the graph." ll. 17-19 P. 3. Claim 7 refers to a **collection** of pages for which authority weights are to be computed. The bookmark coloring process also takes as an input a **set** of one or more pages in the collection which contain initial color loading (authority weights). The set of one or more pages is referred to as bookmarks in the specification. "Inputs to a BCP might include a graph, a set of nodes for initial color loading (which are "bookmarks" in many

examples herein), viscosity parameters (indicating how much "color" sticks and how much is passed on), propagation thresholds, and other parameters." P 15 lines 16-17. The set of one of more pages (bookmarks) are part of the collection.

While every page in the set of one or more pages belongs to the collection, not every page in the collection necessarily belongs to the set of one or more pages. Using set theory notation the relationship between collection and set can be expressed at **set ⊂ collection**. Therefore, the specification describes "at least some pages, within the collection, that do not belong to the set of one or more pages."

Fig. 4 of the specification provides a written description of subject matter "current page", "next page", "outgoing link from the current page to a next page that belongs to the collection", and "establishing the next page as the current page." Fig. 4, details pseudo code of bookmark coloring according to one embodiment of the invention. In Fig. 4 a single bookmark is used, with a color loading of 1. "Conceptually, the bookmark-coloring process suggested by (Equation 10) can be implemented by a program according to Fig. 4, with w=1:p=BCP(b,α) and BCP(b, α)=BC(b,1, α). The recursion over all links from b to j can be cut off when the color amount becomes so small that its further distribution is infeasible or not likely to significantly affect the results." ll 27-31 p. 15

Specifically subject matter "current page", "next page", and "outgoing link from the current page to a next page that belongs to the collection" is shown in the control portion of the for loop expression "for all links b→j in E". The "for loop" traverses outgoing links from a bookmark b or the "current page" to determine page j or the "next page". The condition "in E" indicates that only extant links in the adjacency matrix are followed. E is an adjacency matrix detailing links between pages in a collection of pages for which authority weights are to be established. "Let E=E(W) be an edge indicator or an adjacency matrix for a graph W, wherein

E_{ij}=1 in the matrix E if there is a link i-j between page i and page j and E_{ij}=if there is not a link." p. 3 lines 27-29 . The collection of pages for which authority weights are to be established are represented by a directed graph consisting on a set of nodes and edges and an adjacency metrics details connection between every node in the graph. Therefore the specification provides support for subject matter "outgoing link from the current page to a next page that belongs to the collection".

The body of the loop "p=p+BCP(j,(1- α)·w/deg(b), α)" provides support for subject matter "establishing the next page as the current page". The body of the loop shows a recursive call to the BCP process BCP(j,(1- α)·w/deg(b), α). In the recursive call j which is the "next page" becomes b a bookmark or "current page", whenever the BCP process is executed in response to the recursive call.

The subject matter "on the authority weights associated with the pages that match the search query" recited in Claim 7 is described in the specification in the following excerpts: "A search might proceed as follows: a searcher presents a query (e.g. "new york police") to a search engine and the search engine returns a set of hits (e.g., results, pages, documents, items, etc.) that contain terms of a query (or otherwise "match" the query)." p. 2 ll. 15-17. "With the authority values in hand, a search engine can optimize search results by ranking hits comprising the search results to better match top pages to likely user intent, e.g., relevancy." p.3 ll. 4-5. The excerpts describe "presenting the search results that list the pages that match the said search query based, at least in part, on the authority weights associated with the pages that match the search query."

Based on the foregoing, the subject matter identified by the Office Action is described in the specification. The applicant respectfully requests the rejection be withdrawn.

CLAIM REJECTIONS 35 U.S.C. § 112 SECOND PARAGRAPH

Claims 7-14 were rejected under 35 U.S.C. § 112 second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards at the invention. The Office Action seeks to clarify how assigning weights to the documents in the set also allows assigning the weight to the documents that do not belong to the set.

The bookmark coloring process takes as an input a graph representing a collection of hyperlinked pages. "Where a collection of items can be represented by a graph, as a collection of hyperlinked pages can, an authority vector might represent the set of authority values for a vertex of the graph." Ll 17-19 P. 3. Claim 7 refers to a **collection** of pages for which authority weights are to be computed. The bookmark coloring process also takes as an input a **set** of one or more pages in the collection which contain initial color loading (authority weights). The set of one or more pages is referred to as bookmarks in the specification. "Inputs to a BCP might include a graph, a set of nodes for initial color loading (which are "bookmarks" in many examples herein), viscosity parameters (indicating how much "color" sticks and how much is passed on), propagation thresholds, and other parameters." P 15 lines 16-17. The set of one of more pages (bookmarks) are part of the collection.

While every page in the set of one or more pages belongs to the collection, not every page in the collection necessarily belongs to the set of one or more pages. Using set theory notation the relationship between collection and set can be expressed at **set $\subset$ collection**. Therefore while distributing authority weights from the set of one or more pages, some pages

belonging to the collection but not belonging to the set of one or more pages can receive an authority weight.

THE REJECTIONS BASED ON THE PRIOR ART

Claims 1 was rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Page ("U.S. Patent No. 6,285,999" hereinafter "Page"). While Page describes the computation of a PageRank vector, Page fails to teach every feature of new Claim 7.

Claim 7 recites:

A computer-implemented method for presenting a set of search results, the method comprising:
assigning, to each page of a set of one or more pages, an authority weight;
wherein the authority weight assigned to each page represents a relative importance of the page relative to other pages;
for each page in the set of pages, recursively distributing the page's authority weight over pages that belong to a collection of pages, thereby establishing authority weights for at least some pages, within the collection, that do not belong to the set of one or more pages;
wherein the step of recursively distributing the page's authority weight includes establishing the page as a current page and repeatedly performing the following steps until an end condition is satisfied:
a) following an outgoing link from the current page to a next page that belongs to the collection;
b) distributing a portion of the authority weight to the next page; and
c) establishing the next page as the current page;
receiving a search query that is to be executed against the collection;
identifying a set of pages from the collection that match the search query;
determining how to present search results that list the pages that match the said search query based, at least in part, on the authority weights associated with the pages that match the search query; and
presenting the search results that list the pages that match the said search query based, at least in part, on the authority weights associated with the pages that match the search query.

Page describes the computation of a PageRank vector and a personalized PageRank vector using power iteration techniques while Claim 7 of a computation using a novel recursive

method which follows all outgoing links from a bookmark. Admittedly, Page mentions a recursive **definition of the term rank**. "This implies a recursive definition of rank: the rank of a document is a function of the ranks of the documents that cite it." Page Col 2, Line 67 However, the fact that Page uses a recursive definition for a term has nothing to do with how authority weights are distributed according to Page. In order compute the PageRank vector i.e. distribute the authority weights, Page teaches the use of iterative techniques. "The ranks of documents may be calculated by an iterative procedure on a linked database." Page Col 3 Lines 2-3

The actual computation is detailed in Page col 6 lines 12-21. The algorithm works by taking any initial set of ranks "At a step 101, an initial N-dimenstional vector p_0 is selected." and multiplying the initial set of ranks with a square matrix A raised to nth power (A's rows and columns correspond to **all** the crawled web pages and the probabilities of transition from one to another) "An approximation p_n to a steady-state probability p_∞ in accordance with equation $p_n=A^n p0$ is computed at a step 103. Matrix A can be an NxN transition probability matrix having elements A[i][j] representing a probability of moving from node i to node j." On the other hand Claim 7 teaches **of recursively distributing the page's authority weight**. **Which includes establishing the page as a current page and repeatedly performing the following steps until an end condition is satisfied**, following an outgoing link from the current page to a next page that belongs to the collection; distributing a portion of the authority weight to the next page; and **establishing the next page as the current page**. Page in fact teaches away from using a recursive technique. Iterations globally treat all the nodes equally and spend most of the time on irrelevant nodes. In comparison, recursive method utilizes local propagation – it never touches certain distant nodes. This results in a computation of authority weights that is significantly faster than computing of a page-specific PageRank vector. Because

Claim 7 contains features not taught or suggested by Page it is therefore not anticipated by Page et al. and Page. It is respectfully submitted that the rejections are withdrawn.

The Office Action alleges that Fig. 2 in Page teaches the feature "**wherein the step of recursively distributing the page's authority weight includes establishing the page as a current page and repeatedly performing the following steps until an end condition is satisfied: a) following an outgoing link from the current page to a next page that belongs to the collection; b) distributing a portion of the authority weight to the next page; and c) establishing the next page as the current page;**" , however this is not the case. Fig. 2 in Page is a diagram of a three-document web illustrating the rank associated with each document. Fig. 2 does not illustrate how page rank is computed. In fact the rank of every page in Fig. 2 is established by setting up and solving a system of equations using inspection. "r(A)=r(B) … r(B)=r(A)/2 … r(C)=r(B)+r(A)/2 …In this simple illustrative case we can see by inspection that r(A)=0.4, r(B)=0.2, and r(C)=0.4." Page col. 4 lines 41-64.

Based on the foregoing, Page fails to teach at least several features of Claim 7 and thus fails to teach all the features of Claim 7. By their nature dependent Claims 8-13 limit the scope of independent Claim 7. Because it was shown that independent Claim 7 contains features not taught by the cited prior art reference, reconsideration and removal of these rejections is respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,

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on June 20, 2007 by Tracy Reynolds
Tracy Reynolds